

ruthenium film which substantially prevents voids due to electromigration of copper of the copper film, and said copper film interconnect has a multilayered structure comprising a copper film as formed through sputtering and a copper film as formed through plating.

2. (Amended) A semiconductor device with a multilayered structure comprising a copper film interconnect formed on one primary surface of a semiconductor substrate, and a neighboring film formed in contact with said copper film interconnect, wherein said neighboring film is formed of a ruthenium film which substantially prevents voids due to electromigration of copper of the copper film, and said copper film interconnect has a multilayered structure comprising a copper film as formed through physical vapor deposition and a copper film as formed through chemical vapor deposition.

3. (Amended) A semiconductor device with a multilayered structure comprising a copper film interconnect formed on one primary surface of a semiconductor substrate, and a neighboring film formed in contact with said copper film interconnect, wherein said neighboring film is formed of ruthenium as the primary constituent element, and is formed through sputtering, and said copper film interconnect has a multilayered structure comprising a copper film as formed through sputtering and a copper film as formed through plating or chemical vapor deposition.

*Pub 03*

4. (Amended) A semiconductor device with a structure comprising a copper film interconnect formed on one primary surface of a semiconductor substrate, and a plug formed in contact with said copper film interconnect, wherein said plug is formed of at least one film selected from the group consisting of rhodium film, a ruthenium film, an iridium film, an osmium film and a platinum film, which substantially prevents voids due to electromigration of copper of the copper film, and at least one of said copper film interconnect said plug contains a layer as formed through physical vapor deposition.

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5. (Amended) A semiconductor device with a structure comprising a copper film interconnect formed on one primary surface of a semiconductor substrate, a neighboring film formed in contact with said copper film interconnect, and a plug formed in contact with said neighboring film, wherein said neighboring film is formed of ruthenium as the primary constituent element, said plug is formed of ruthenium as the primary constituent element, and at least one of said copper film interconnect and said plug contains a layer as formed through physical vapor deposition.

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6. (Amended) A semiconductor device with a structure comprising a copper film interconnect formed on one primary surface of a semiconductor substrate, a neighboring film formed in contact with said copper film interconnect, a plug formed in contact with said neighboring film, and a diffusion

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barrier formed in contact with said plug and said neighboring film, wherein said neighboring film is formed of a ruthenium film, said plug is formed of a ruthenium film, said diffusion barrier is formed of a titanium nitride film, and at least one of said copper film interconnect and said neighboring film is a film formed through sputtering, wherein the neighboring film and the plug substantially prevent voids due to electromigration of the copper or platinum of the copper or platinum film.

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9. (Amended) A semiconductor device having a layered interconnection structure including a copper film or a platinum film formed overlying a surface of a semiconductor substrate, wherein the layered interconnection structure includes the copper or platinum film and a neighboring film adjacent the copper or platinum film, the neighboring film being made of a material selected from a first group consisting of rhodium, ruthenium, iridium, osmium and platinum when the layered interconnection structure includes a copper film and the neighboring film is made of a material selected from a second group consisting of rhodium, ruthenium, iridium and osmium when the layered interconnection structure includes a platinum film, at least one of (a) the copper or platinum film and (b) the neighboring film being a film made by physical vapor deposition, the device further comprising a diffusion barrier layer, said neighboring film being sandwiched between said copper or platinum film and said diffusion barrier layer, wherein the neighboring film

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substantially prevents voids due to electromigration of the copper or platinum of the copper or platinum film.

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25. (Amended) The semiconductor device according to claim 24, further comprising another diffusion barrier layer between the plug and the further neighboring film, wherein the another diffusion barrier layer is at least one film made of material selected from the group consisting of titanium nitride, tungsten and tantalum.

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27. (Amended) A semiconductor device having a layered interconnection structure including a copper film formed overlying a surface of a semiconductor substrate, wherein the layered interconnection structure includes the copper film and a neighboring film adjacent the copper film, the neighboring film being made of a material selected from a group consisting of rhodium, ruthenium, iridium, osmium and platinum, at least one of (a) the copper film and (b) the neighboring film being a film made by physical vapor deposition, wherein the neighboring film substantially prevents voids due to electromigration of copper of the copper film.

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28. (Amended) The semiconductor device according to claim 27, further comprising another neighboring film, adjacent a side of the copper film opposite a side thereof having said neighboring film adjacent thereto, said another neighboring film being made of a material selected from the

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group consisting of rhodium, ruthenium, iridium, osmium and platinum.

Please add the following new claims to the application:

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--30. A semiconductor device having a layered interconnection structure including a copper film formed overlying a surface of a semiconductor substrate, wherein the layered interconnection structure includes the copper film and a neighboring film adjacent the copper film, the neighboring film containing a material selected from a group consisting of rhodium, ruthenium, iridium, osmium and platinum as the primary constituent element, at least one of (a) the copper film and (b) the neighboring film being a film made by physical vapor deposition.

31. A semiconductor device having a layered interconnection structure including a copper film or a platinum film formed overlying a surface of a semiconductor substrate, wherein the layered interconnection structure includes the copper or platinum film and a neighboring film adjacent the copper or platinum film, the neighboring film having, as the primary constituent element thereof, an element selected from a first group consisting of rhodium, ruthenium, iridium, osmium and platinum when the layered interconnection

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structure includes a copper film, and the neighboring film has, as the primary constituent element thereof, an element selected from a second group consisting of rhodium, ruthenium, iridium and osmium when the layered interconnection structure includes a platinum film, at least one of (a) the copper or platinum film and (b) the neighboring film being a film made by physical vapor deposition, the device further comprising a diffusion barrier layer, said neighboring film being sandwiched between said copper or platinum film and said diffusion barrier layer.--